Corporate Debt Restructuring and Public Financial Institutions in Japan –Do Government-Affiliated Financial Institutions Soften Budget Constraints?–

Kenya Fujiwara

Professor, School of Business Administration, Kobe University

Abstract

There are two different views on the effects of public financial institutions on corporate debt restructuring: the soft budget view and the hard budget view. The former view, which is held by Kornai (1979, 1983), Dewatripont and Maskin (1995), and others insists that because centralized public financial institutions have difficulty committing themselves to refrain from providing additional funds to distressed firms, corporate reorganizations often result in overinvestment. On the other hand, the latter view argues that public financial institutions should prefer corporate liquidation rather than the continuation of business because public financial institutions are secured by mortgages to a greater extent and are more reluctant to forgive the debts than private financial institutions.

In this paper, I have empirically examined the role and impact of public financial institutions, government-affiliated financial institutions in particular, from the viewpoints of debtor-in-possession (DIP) financing and bankruptcy procedures for distressed firms.

The conclusions of this paper are as follows.

In the DIP financing, the Development Bank of Japan always takes the lead, followed by private financial institutions. Namely, so-called cowbell effect may exist, which is inconsistent with the hard budget view. Regarding the selection of bankruptcy procedures, firms that owed to government-affiliated financial institutions have a tendency to opt for private procedures which have the effect of delaying a drastic debt restructuring. This is consistent with the soft budget view.

I. Introduction

The problem of financial institutions making additional loans to, or forgiving the debt of,

distressed firms that should otherwise go bankrupt is generally called the soft budget problem.

The concept of the soft budget problem was originally proposed by Kornai (1979 and 1983), and was used to refer to factors that caused shortages of goods in a socialist economy. However, Dewatripont and Maskin (1995), Qian and Xu (1998), Li (1998), and others have recast the concept to refer to a problem that could happen in any centralized economy or the public sector in general. For example, Dewatripont and Maskin (1995) explained that when there is only one lender (e.g., a financial institution or the government) in a centralized economy, the existence of sunk costs (existing loans) could trigger additional loans that may cause overinvestment. Li (1998), Shleifer and Vishney (1994), and others have argued that when the public sector has a controlling right over a firm, rent-seeking activities by the private sector will bring about a possibility for inefficient projects to remain. In either case, the difficulties of committing to refrain from implementing inefficient projects cause the soft budget problem.

In this paper, I would like to focus on public financial institutions--government-affiliated financial institutions in particular—to examine whether the existence of government-affiliated financial institutions softens or hardens (i.e., raises the efficiency of) the budget constraints of distressed firms. Especially, I will examine influences of the existence of government-affiliated financial institutions in DIP financing and the selection of bankruptcy procedures [1]. The relationship between corporate debt restructuring and government-affiliated financial institutions is important not only when we examine whether such institutions are hard or soft, but also when we evaluate reorganizations led by the Industrial Revitalization Corporation of Japan etc.

This paper is structured as follows.

In Section II, arguments on the soft budget problem in the public sector are discussed and their implications to Japanese public financial institutions are considered. In Section III, previous studies on DIP financing are reviewed and the role of government-affiliated financial institutions, especially the Development Bank of Japan, on DIP financing in Japan are examined. Section IV focuses on choices of bankruptcy procedures or debt restructuring methods, including legal and private procedures, and on the suitability of a chosen procedure for maximizing a firm's value. I will also discuss the effects of lending by government-affiliated financial institutions on the selection of bankruptcy procedures and as well as on the efficiency of bankruptcy procedures. Section VI concludes the paper.

[1] In this paper, the question of whether the debt restructuring led by the Industrial Revitalization Corporation of Japan is soft or hard is not directly analyzed because there are not enough samples at this point. The same applies to the question of debt restructuring in the third sector.

II. The Public Sector and the Soft Budget Problem

II.1. The Public Sector and the Soft Budget Problem

The concept of the soft budget constraint problem is said to have been first introduced by Kornai (1979 and 1983). A soft budget constraint refers to a situation where a firm is allowed to receive subsidies or additional loans in the amount exceeding the level originally considered efficient, regardless of whether the additional funds are from a bank or a government. According to Kornai (1983), soft budget constraints in a centralized (socialist) economy can be categorized into five categories: (1) discretion in determining prices, (2) discretionary tax policies, (3) discretionary subsidy systems, (4) discretionary giving of credit, and (5) discretionary external investment. Discretion in determining prices in (1) refers to a situation where monopolistic or oligopolistic firms can set prices. In this case, the budget softens in the sense that firms can easily pass increased input costs onto output prices. Even when output prices are regulated by the authorities, firms can pass their costs on by exercising their political influence over the decisions made by the authorities. The discretionary tax policies and subsidy systems in (2) and (3) refer to situations where firms can influence tax or subsidy policies through the political activities of a certain industry. Discretionary giving of credit in (4) and discretionary external investment and financing in (5) represent similar concepts, and refer to situations where government–affiliated companies may postpone a repayment at any time, or receive additional loans. In sum, the existences of regulations, including policies for taxation and subsidies that are characteristic of a centralized economy, as well as the existence of discretion over capital distribution, are factors that soften corporate budget constraints.

Under soft budget constraints, even a firm that should otherwise disappear from the market (i.e., a company that is constantly losing money and has no recognized corporate value) continues to operate without going bankrupt. Nor does such a firm examine efficient input and output combinations in accordance with changes in factor/output prices; it can ignore price signals. This means that the risk of corporate management failure can be passed on to the government through changes in regulations and subsidies. For these reasons, Kornai (1983) concluded that in a centralized (socialist) economy, demand for inputs is limitless and, as a result, resource shortages become a normal state.[2]

Dewatripont and Maskin (1995), Segal (1998), Li (1998), Shleifer and Vishney (1994), and others have shed light on the studies by Kornai (1979 and 1983) and approached the soft budget problem theoretically.

According to Maskin (1996 and 1999), the soft budget problem can be classified into three categories: (1) concentration of lenders, (2) concentration of production organizations (i.e., the

[2] Kornai's (1978 and 1983) arguments about soft and hard budget constraints and their consequences are also summarized by Itoh and Osano (2003).

emergence of an oligopoly), and (3) distribution of controlling rights over a firm to the government. He argued that budget constraints soften in each of these cases.

First, let us look at (1) the concentration of lenders. Based on the idea of Dewatripont and Maskin (1995), Maskin created a model in which there is a centralized financial institution (i.e., a single lender), and additional loans tend to be extended even to firms that should otherwise be liquidated, or when a project should otherwise be cancelled.

Let us assume that there are two types of investment projects: fast and slow. The former requires one unit of funding at the beginning of the first period, and will produce a profit of R_f (>1) at the end of the first period. The latter requires one unit of funding at the beginning of the first period as well as at the end of the first period, and will produce a profit of $\tilde{R}_s$ at the end of the second period. That is, $\tilde{R}_s$ is a random variable and also depends on the degree of monitoring efforts by the bank, which is measured by p. $\tilde{R}_s$ equals R ($2>R>0$) with probability p, and 0 with the probability $1-p$.

Let us also assume that a firm (entrepreneur) does not have its own capital and has to borrow from a bank the entire amount necessary to implement a project. The firm (entrepreneur) will get a private profit of Ec (>0) if the project is completed. Conversely, it suffers a private loss of Ei (<0) if the project is not implemented or cancelled at the end of the first period. The firm already knows whether the project is fast or slow, but a lender bank does not. So, there is an asymmetry of information between the two parties. It is assumed that at the beginning of the first period a loan is executed without the lender distinguishing whether the project is the fast or slow type. This information will be known, however, at the end of the first period. Since there is only one lender bank and it has monopolistic bargaining power, all the proceeds from the project except for the firm's (entrepreneur's) private benefits will belong to the bank.

Let us assume that the loan was executed and the firm implemented a fast project. In this case, the net profits of the bank and the firm are expressed respectively as:

Bank: $R_f-1>0$

Firm (Entrepreneur): $Ec > 0$

If the project is slow, the net profits of the bank and the firm depend on whether or not an additional loan is provided at the end of the first period, which is expressed as:

Bank:

-1 if an additional loan is not provided for the second period

$p^*R-\psi(p^*)-2 \quad (\psi'(p^*)=R)$ if an additional loan is provided for the second period

Firm (Entrepreneur):

$Ei < 0$ if an additional loan is not provided for the second period

$Ec > 0$ if an additional loan is provided for the second period

It is assumed that $\psi(p)$ is the function for the cost of the bank to monitor the slow project. It is an increasing and convex function. In other words, $p^*R-\psi(p^*)-2 \quad (\psi'(p^*)=R)$ represents

the expected net profit from the slow project for the second period when the bank performs optimal monitoring activities.

Whether or not the bank will extend an additional loan to the slow project at the end of the first period depends on the magnitude of $p^*R-\psi(p^*)-2$ and -1.

If $p^*R-\psi(p^*)-2 > -1$, then the bank will agree to an additional loan. However, $R < 2$ means $p^*R-\psi(p^*)-2 < 0$. This means that the slow project itself is not an efficient undertaking for the bank and for society as a whole, hence firms with slow projects present soft budget problems.

What lies behind the soft budget problem is that under a single lender, a loan during the first period turns into sunk costs, and the lender cannot refuse an additional loan in the second period. That is, it cannot commit to refuse additional lending.

In other words, if a lender can commit to refuse additional lending, the soft budget problem should be mitigated. Dewatripont and Maskin (1995) argued that one method to achieve this commitment is to have a decentralized economy, which equates to an increased number of lenders (two lenders in this example).

Then, let us assume that the first bank provides an initial loan to a firm and the second bank will determine whether or not it will lend the firm additional funds at the end of the first period. The assumption is that each bank has only one unit of capital and that raising funds from a third bank is costly for both banks. In this case, whether or not the second bank will provide an additional loan depends on the magnitude of contracted interest that the second bank can obtain, and on the probability of the project's success, which requires a monitoring by the second bank. The first bank, which provided the initial loan, also has a claim over R. Therefore, the net profit that the second bank makes from the additional loan is expected to be smaller than $p*R-\psi(p*)-1$ unless the contracted claim of the second bank has complete priority over that of the first bank. Furthermore, the degree of monitoring by the second bank will become smaller than $p*$ when the second bank can obtain only a part of R. This effect also reduces the expected profit for the second bank from the additional loan. If the second bank's expected profit from the additional loan becomes a negative value, the second bank would not agree to the additional loan. This means that having multiple (decentralized) lenders can mitigate the soft budget problem to a certain degree. In other words, having multiple lenders creates conflicts of interest among the lenders and makes additional financing difficult via the so-called debt-overhang mechanism.

Next, let us look at (2) the concentration of production organizations (i.e., the emergence of an oligopoly) and (3) the distribution of controlling rights over a firm to the government.

As for (2), Segal (1998) has used a model involving a monopolistic firm in a regulated industry to explain that the concentration of production could cause soft budget constraints. According to Segal (1998), a government may want monopolistic companies such as public utilities to continue operating with support from government subsidies even when their losses are sufficient to force the firms out of business. However, if there is an information asymmetry

between the government and a monopolistic firm about the type of investment or the degree of efforts by the firm, the monopolistic firm is motivated to seek a subsidy rather than to improve productivity by investing. This aggravates the soft budget problem. Qian and Xu (1998) argued that R&D performance will be poor under a centralized (socialist) economy due to this kind of soft budget problem.

Incidentally, according to the arguments above, we can expect to improve productivity by lowering the degree of concentration or by raising the level of competition within the oligopoly or the industry, thereby decreasing the possibility of receiving a subsidy. In this sense, we can say that case (2) is similar to case (1), concentration of lenders.

In the meantime, case (3), the distribution of controlling rights over a firm to the government, is different from the first two cases in that a soft budget problem arises when controlling rights over a firm belong to the government, even partially. Li (1998), as well as Shleifer and Vishney (1994), discussed the soft budget problem from the viewpoint of a government's (partial) holding of controlling rights over a firm. They argued that when the public sector holds even a part of the managerial control rights of a firm, a type of rent-seeking activity happens between the firm (entrepreneur) and the public sector, which will cause the soft budget problem.

For example, in case (1), let's assume $p^*R-\psi(p^*)-2 < -1$ is valid. In this case, the additional loan would not be provided even if there is a concentration of lenders (single bank). However, if the lender shares the managerial control rights over the firm with the existing manager (entrepreneur), an incentive for the lender to provide the additional loan may be created, since the lender can share the private benefit from the continuation of the slow project.

Suppose that $E_c + p^*R-\psi(p^*)-1 > E_i$ is satisfied. This creates the possibility that the lender and the firm may collude with each other or that the firm may have bribed the lender in return for *Ec (Ei)*, which would make the additional loan profitable for the lender.

II.2. Do Public Finance Institutions Really Soften the Budget Constraints?

So far, I have examined cases in which serious soft budget problems arise with public sector involvement. Now, how much do these arguments hold true to the Japanese public financing system? In the following paragraphs, I will briefly examine this issue from the viewpoints of (1) concentration of lenders (centralization), (2) concentration of production (monopoly), and (3) the public sector's holding of managerial rights. I will also examine the possibility that public financing by government-affiliated financial institutions, in particular, hardens budget constraints.

II.2.1. The Soft Budget View

First, let us discuss (1) concentration of lenders (centralization). Japanese public financial institutions are huge organizations and have large amounts of money. The funds in postal savings and postal insurance accounts total 340 trillion yen, exceeding the combined total of funds held by large private banks. The percentage of postal savings in household financial assets was about 17% in 2002. The share of government-affiliated financial institutions in the lending market was about 28% in 2001. If we look at the public financial system as one financial institution, we can consider it as a huge centralized financial institution, as in Dewatripont and Maskin's argument (1995). Of course, in reality, public financial institutions are not a single centralized organization, where postal savings as entry institutions and the government-affiliated financial institutions as exit institutions are divided. However, each institution is partly becoming independent; for example, the postal savings is allowed to invest on its own, while some government-affiliated financial institutions finance independently, issuing *Zaito Kikansai* (bonds without government guarantee). Furthermore, as for the government-affiliated financial institutions, consolidations are under way. For example, the Japan Development Bank was consolidated with the Hokkaido-Tohoku Development Finance Public Corporation in 1999, forming the current Development Bank of Japan, and the Export-Import Bank of Japan was consolidated with The Overseas Economic Cooperation Fund, forming the Japan Bank for International Cooperation.[3] According to Dewatripont and Maskin, this trend toward the consolidation of government-affiliated financial institutions may increase exposure of the soft budget problem[4]. Indeed, it is said that the bad loans held by government-affiliated financial institutions amounted to about 4.2 trillion yen as of the end of March 2001, and about 6.4 trillion yen has already been provided by the government to make up for the losses at these institutions over the past ten years.

Next, the argument about (2) concentration of production or subsidies to monopolistic firms may be applicable to so-called special companies, such as NTT, Japan Tobacco (JT), Tokyo Metro Co., and Narita International Airport Corp. Furthermore, the argument about the public sector's holdings of management rights may be applied to the Japan Highway Public Corp. and various independent administrative entities. The media have been strongly criticizing these companies for continuing inefficient projects. A type of rent-seeking activity between the private sector (interest groups) and the public sector (politicians) may be inviting the softening of budget constraints.

[3] According to some media reports, there is a plan under discussion to consolidate eight government-affiliated financial institutions into two organizations.

[4] There is also a possibility that the consolidation of the Japan Development Bank and the Hokkaido-Tohoku Development Finance Public Corporation, both of which suffered from bad loans, had advanced the concentration and softened the budget constraint.

II.2.2. The Hard Budget View

Do all government–affiliated financial institutions soften budget constraints? Some facts may suggest that government–affiliated financial institutions do in fact harden budgets.

For example, let us look at the forgiveness of debts by government–affiliated financial institutions. According to newspapers, government–affiliated financial institutions were not allowed to waive debts through other than legal procedures until March 2003, when the Development Bank of Japan waived debt outside the courts for the first time (the Hakodate Dock case).

Furthermore, as the Japanese Bankers Association reports, government–affiliated financial institutions often have liens of first priority. This means that government–affiliated financial institutions have an interest as senior (secured) creditors. It would seem that government–affiliated financial institutions have little incentive to help reorganize a borrower because, in general, secured creditors prefer liquidation rather than the continuation of business. In fact, some newspapers say there are cases where a borrower was forced to liquidate because a government–affiliated financial institution did not cooperate with a reorganization plan even though other, private financial institutions had agreed to it. If this is true, we may be able to say that the existence of government–affiliated financial institutions hardens budget constraints.

Table 1 shows changes in borrowing from banks and the amount of debt forgiveness in the Daiei Co. case based on a reorganization plan under the initiative of the Industrial Revitalization Corporation of Japan in 2005. When we look at the changes in borrowings from banks, we can see that the lending shares and balances of the three major private banks (UFJ, Sumitomo Mitsui, and Mizuho) had increased annually, and that the so–called *mein yose* (the concentration of debts with main banks) was happening rapidly. In the meantime, the lending shares and balances of the Development Bank of Japan, a government–affiliated financial institution, were much the same as those of the three main banks in the beginning of 2000, but they have decreased every year since then. When we look at the amount of debt forgiveness, the waived debt percentages against the lending balances of the three main banks as of 2004 were 40% to 50%, while that of the Development Bank of Japan was only about 14%. Some newspapers reported that the percentage of debt waiver for all unsecured claims was 81.1% on average. This means that the Development Bank of Japan has a high percentage of secured claims.

In fact, according to Daiei's annual report, collateral/security was provided for long–term borrowings from the Development Bank of Japan, while no collateral/security was provided for long–term borrowings from private banks. In addition, although the repayment dates for the private banks tended to be earlier than those for the Development Bank of Japan, the borrowings from private banks tended to be refinanced, and the terms of their loans were in fact made longer. In contrast, the borrowings from the Development Bank of Japan were certainly repaid

Table 1: Trend of Balance of Loans of Daiei from Financial Institutions

100 Millions of yen

	2000		2001		2002		2003		2004		Amount of Debt Waived (Debt Waver Ratio)	
UFJ	672	(17.5)	2676	(36.1)	3504	(40.6)	3540	(43.2)	4206	(43.6)	2043	(48.6)
Mitsui Sumitomo	394	(10.3)	1338	(18.1)	1768	(20.5)	1573	(19.2)	1906	(19.7)	853	(44.7)
Mizuho	506	(13.2)	1338	(18.1)	1857	(21.5)	1768	(21.6)	2101	(21.7)	836	(39.8)
Tokyo Mitsubishi	146	(3.8)		N/A		N/A	100	(1.2)	100	(1.0)	57	(57)
Development Bank	315	(8.3)	250	(3.4)	178	(2.1)	160	(1.9)	99	(1.0)	14	(14.1)
Norinchukin	282	(7.4)	253	(3.4)	253	(2.9)	353	(4.3)	474	(4.9)	227	(47.8)
Others	1506	(39.4)		N/A		N/A	684	(8.4)	764	(7.9)	20	(0)
Total	3821	(100)	7404	(100)	8627	(100)	8178	(100)	9650	(100)	4050	(100)

Note : Numbers in parentheses for each year represent percentages against total loan balance.
Debt waiver ratios are the percentages of requested debt waiver amount of January 2005 against the borrowing balance for 2004.
Source : Annual Report, Daiei Co.

upon maturation. In other words, in terms not only of liens but also of due dates, the claims of the private banks were actually subordinated.

Of course, one can attribute this preferential treatment of the government-affiliated financial institution to the substantial lender responsibilities of main banks. However, the burden of government-affiliated financial institutions seems to be lighter than those of other lenders, even when a private bank is not the primary lender (e.g., a government-affiliated financial institution is the largest lender).

Table 2 shows the burden ratio (percentage of debt waived) of private banks and government-affiliated financial institutions with respect to the debt restructuring of failed third-sector organizations whose largest lender was the Development Bank of Japan.

In the case of Mutsu-Ogawara, Asia and Pacific Trade Center (ATC), and Crysta Nagahori, the percentages of debt waivers by the government-affiliated financial institution were equal to or lower than those of the private financial institutions. In the case of Crysta Nagahori, the loans from the Development Bank of Japan were completely repaid. Although the Development Bank of Japan ended up agreeing to waive debt in the Ishikari Development case, it had initially refused to do so, forcing Ishikari Development to go bankrupt under the *Minji-Saisei ho* (Civil Rehabilitation Law).

Incidentally, there are studies about the role of the Development Bank of Japan, specifically the "cowbell effect" discussed by Higano (1986) as well as by Horiuchi and Zui (1994). According to the latter study, firms that borrowed from the Development Bank of Japan tended to significantly increase their borrowings from private financial institutions after receiving

Table 2: Outline of Third Sector Debt Restructuring

Name of Third Sector Organization	Total Liabilities	Outline of Debt Restructuring
Mutsu-Ogawara Development (Aomori, 2000)	¥185.2 billion	• Establishment of liquidation company • Debt waiver percentage of Development Bank of Japan: about 69% • Debt waiver percentage of private financial institutions: about 69%
Ishikari Development (Hokkaido, 2002)	¥65 billion	• Civil Rehabilitation Law • 35 billion debt waived by financial institutions • Development Bank of Japan refused to waiver the debt before taking legal procedures
Asia and Pacific Trade Center (ATC) (Osaka, 2004)	¥128.5 billion	• Special mediation • Debt waiver percentage of private financial institutions: 65% • Debt waiver percentage of Development Bank of Japan: 60%
Crysta Nagahori (Osaka, 2005)	¥32 billion	• Special mediation • Debt waiver percentage of private financial institutions: 40.7% • Debt from Development Bank of Japan was repaid in full amount

Source : Nihon Keizai Shinbun, etc.

loans from the Development Bank of Japan. They concluded that the fact that a firm had borrowed from the Development Bank of Japan served as a kind of signal (a cowbell), which mitigated the asymmetry of information between the borrowers and private financial institutions. To put it still another way, the cowbell argument implied that the Development Bank of Japan was more capable of producing information than private financial institutions were. If this is true, the Development Bank of Japan not only softens the budget constraint but also hardens it, because private financial institutions never follow the Development Bank of Japan unless it has superior information about distressed firms.

In the following sections, to examine whether government-affiliated financial institutions are hardening or softening the budget constraint, the role and effect of government-affiliated financial institutions on DIP financing and the selection of bankruptcy procedures will be considered.

III. DIP Financing and Corporate Debt Restructuring in Japan

III.1. DIP Financing and Corporate Debt Restructuring

DIP financing refers to loans to distressed firms whose existing manager remains on the job (debtor-in-possession, DIP) under legal bankruptcy procedures such as Chapter 11 of the

United States Bankruptcy Code. In many cases, the cash flow of the bankrupt company rapidly deteriorates. The purpose of DIP financing is to mitigate the deterioration of the firm's value in such a situation.

DIP financing serves not only to prevent the deterioration of a firm's assets by securing immediate running capital, but also to make it easier to carry out an investment project that would increase the value of the firm. However, DIP financing carries with it the risk of overinvestment and enables the funding of projects that should not be funded. Furthermore, since the existing manager will remain on the job under DIP in general, DIP financing may increase the risk of a moral hazard problem ex-ante.

In the following paragraphs, I will provide an overview of Chapter 11 of the United States Bankruptcy Code, and review some previous studies on DIP financing.

III.2. United States Bankruptcy Laws and Studies on DIP Financing

III.2.1. United States Bankruptcy Laws

The U.S. Federal Bankruptcy Reform Act was drastically revised in 1978 and enacted in October of the following year. It provides two types of procedures: liquidation procedures in Chapter 7 and reorganization procedures in Chapter 11.

In Chapter 7 liquidation procedures, a court-appointed trustee sells or disposes of the assets of the firm, and the proceeds are distributed automatically in accordance with the Absolute Priority Rule (APR). This rule (hereinafter referred to as "APR") prioritizes claims against a firm. The proceeds are distributed in the order of secured claims, preferential claims (e.g., trustee fees, labor claims, tax claims, etc.), unsecured claims, shareholders' claims, etc. Creditors of a junior class receive repayment or distribution of assets only after the creditors of a senior class are repaid in full.

On the other hand, Chapter 11 provides procedures intended for the reorganization and restructuring of firms and a trustee is rarely appointed. Instead, a reorganization plan is developed by the existing manager (debtors-in-possession), and after negotiations with creditors' committees of the various classes [5], a plan is submitted for a decision, which is obtained by a majority vote among the creditors from all classes; that is, a majority of creditors who collectively hold two-thirds of the voting rights. Alternatively, if a shareholders' committee is organized, the plan has to be supported by two-thirds of the voting rights. In either case, the plan must then be approved by the court; that is, the court must determine whether or not the plan is feasible and serves the best interests of the vested parties. What is meant by "best

[5] A creditor committee is usually comprised of seven large unsecured creditors appointed by the court. However, depending upon the details of the claim types, the committee may be divided into multiple committees of various classes, or a shareholders committee may be formed.

interests" is that the benefits from the reorganization for individual creditors are equal to or greater than the benefits from liquidation. Once the reorganization plan is approved, the borrower is exempted from all the obligations generated before the adoption of the reorganization plan, and is obliged to make repayment in accordance with the reorganization plan.

If a certain class of creditors opposes the reorganization plan, but the court determines that the plan is fair and equitable, the court will approve the plan anyway. The concept of "fair and equitable" concerns the class of opposing creditors and means that what the opposing creditors would receive under the reorganization plan will be equal to or greater than what they would receive in the case of liquidation. If there is opposition from creditors of any classes, the management needs to give a sufficient explanation about the plan to the court. This procedure is generally called a "cram down" hearing and is considered a factor in delaying approval. If the reorganization plan is disapproved by all the creditors or if the court determines that the plan is not fair and equitable, a revision of the reorganization plan is ordered, and in many cases the case is transferred to Chapter 7 procedures.

The characteristics of Chapter 11 can be summarized in the following four points.

1) Debtor-in-possession (DIP). Unlike Chapter 7, Chapter 11 enables the existing manager to engage in the management of the company as DIP. Of course, prior notice to and approval from the court are needed for the sale or lease of important assets or for borrowings after the bankruptcy; such transactions are known as the "extraordinary course of business." It is difficult, however, to clearly distinguish the "ordinary course of business," which rests within the discretion of DIP, from the extraordinary course. Therefore, the DIP has a bargaining power as a result.
2) DIP's exclusive right to submit the reorganization plan. Once bankruptcy is filed, DIP has 120 days in which to exercise this right. Furthermore, once the DIP submits the reorganization plan during this period, it may request a 60-day extension. It is also allowed to a certain degree to classify unsecured creditors in such a way that the reorganization plan is passed easily. For example, it can combine a minority of opposing creditors with a majority of supporting creditors. This means that the submission timing or the speed of progress of the reorganization plan and its content is, to a significant degree, up to the discretion of DIP.
3) Preferential treatment for new loans (so-called DIP financing) after the bankruptcy. Loans extended after the bankruptcy are given preferential treatment for repayment. The establishment of a lien that is equal or preferential to existing liens (called a "priming lien") is also allowed.
4) The principle of majority decision enables certain creditors and the DIP to legally control and dismiss the opinions and rights of minority creditors. However, this is applicable only to unsecured creditors; secured creditors are not subject to these procedures.

III.2.2. Views on DIP Financing

Gertner and Scharfstein (1991) pointed out that the characteristics of Chapter 11 described above, including automatic stay (suspension of payment), the rights of the DIP, and the principle of majority decision, could create an environment that is advantageous to subordinated creditors, such as shareholders or DIP, and that consequently causes an overinvestment socially For example, while automatic stay freezes repayment obligations, the fact that the DIP has exclusive rights to submit the reorganization plan and classify creditors facilitates a reorganization that serves its self-interests. In particular, when the cost of prolonged negotiations is high (e.g., the discount rate is high), the DIP will have significant bargaining power, and a large amount of rent may go to the subordinated creditors or shareholders as well as to DIP.

Hotchkiss (1995) studied the performance of 197 companies after their procedures under Chapter 11 were approved and completed. He found that about 40% of the companies continued to lose money for three years after the completion of the procedures, and 32% of the companies in the study (i.e., 32% of the 197) had either filed for Chapter 11 again or gone to private procedures. Based on this observation, he concluded that Chapter 11 is biased towards excessive reorganization.

In the meantime, Eberhart, Altman, and Aggarwal (1999) conducted an event study of stock price reactions for 131 companies that had completed reorganization plans approved under Chapter 11. They found that news of the completion of the reorganization plans generated abnormally positive increases in stock prices. Although this result does not directly negate Hotchkiss's analysis, it presents an opposing view on companies that have completed Chapter 11 procedures.

Lastly, Dahiya, John, Puri, and Ramirez (2003) gave an overview of DIP financing and conducted an empirical analysis of its economic impact. According to their studies, about 30% of the companies that filed for Chapter 11 from 1988 to 1997 received DIP financing. There was a particularly high number of DIP financing cases among retailers with relatively high percentages of liquid assets. They also analyzed the relationship between the length of time from the filing of Chapter 11 to the completion of the reorganization plan (or liquidation when a case was moved to Chapter 7) and DIP financing, and found that companies that received DIP financing completed their reorganization or liquidation sooner. This can be interpreted to mean that DIP financing mitigates the problem of underinvestment and accelerates decision-making toward both reorganization and liquidation. In this respect, if we accept the results of the empirical study by Eberhart, Altman, and Aggarwal (1999), we can say that early completion of the reorganization plan increases stock values. In that sense, DIP financing may increase corporate values. Meanwhile, early liquidation is also generally considered to contribute to the maintenance of a firm's value, and therefore DIP financing can be considered to have a positive

effect in this respect as well. Dahiya, John, Puri, and Ramirez (2003) found that existing creditors (banks) tend to extend DIP financing for relatively small companies; or, in cases of pre-packaged Chapter 11s, external creditors tend to extend DIP financing to large companies. They interpret this to mean that the problem of asymmetry of information is significant for small companies, and therefore the monitoring capability of existing creditors (banks) is important.

III.3. Outline of DIP Financing in Japan

Our first example of DIP financing in Japan is the case of Footwork Express Co., which filed for procedures under *Minji Saisei ho* (Civil Rehabilitation Law) in May 2001. Shortly thereafter, Footwork Express Co. obtained credit line from the Development Bank of Japan in the amount of 2 billion yen. More recently, DIP financing has attracted attention as a way to enhance the functions of relationship banking. According to a report by the Financial Service Agency ("Progress Status of Action Program to Enhance Relationship Banking Functions"), there were 216 cases totaling 60.3 billion yen in 2003 and 330 cases totaling 70.8 billion yen in 2004.

Table 3 summarizes the implementation status of DIP financing in Japan. These data are from Nihon Keizai Shimbun and a website of the Development Bank of Japan. Although news about DIP financing is not scarce, specific information and details are not clear. Therefore, cases covered by Table 3 are limited to those for which a certain degree of information was available regarding whether the lender in DIP financing was an existing bank (existing/main bank) or not (new/non-main bank) and whether or not the DIP financing was accelerating the reorganization (or liquidation) of a firm.

When we look at lender banks, we notice that the Development Bank of Japan was the lender for DIP financing in more than half of the cases. It was involved, in particular, as lender in all cases until the beginning of 2003. Furthermore, in many cases the Development Bank of Japan extended loans as new/non-main bank for borrowers. In many cases, private banks were involved in DIP financing when they had already been lenders, and, if not, they collaborated with the Development Bank of Japan. Although in about 30% of the cases a new/non-main bank was involved in DIP financing alone, this activity was involved with one bank in particular: Tokyo Star Bank.

In many cases, the purpose of the DIP financing was to reorganize the business. In fact, quite a number of cases of DIP financing had as their purpose the early completion of reorganization or a lump-sum repayment of secured claims. There seem to be few cases of liquidation after DIP financing. This may have something to do with the fact that Japan does not have a long history of DIP financing and thus only a few years have passed since firms have begun receiving it.

Table 3: DIP Financing in Japan

Company Name	Month /Year	Amount of Loan (Credit Limit billions of yen)	Lender	New Non-main/ Existing Main	Type of Legal Procedures	Comments
Footwork Express	05/01	2	DBJ Fuji Bank	New non-main New non-main	Corporate reorganization (*kaisha-kousei*)	Reorganized under the sponsorship of Orix
Mycal	10/01	10	DBJ	New non-main	Corporate reorganization (*kaisha-kousei*)	Reorganized under the sponsorship of Aeon
Niigata Engineering	12/01	5	DBJ	New non-main	Corporate reorganization (*kaisha-kousei*)	
Daiichishiko	02/02	0.2	DBJ DKB	New non-main New non-main	Corporate reorganization (*minji-saisei*)	
Fuji Polymer	07/02	1	DBJ Mizuho Bank Mitsui Sumitomo Bank Nanto Bank Shokochukin	New non-main New non-main Existing main Existing main Existing main	Corporate reorganization (*kaisha-kousei*)	Loans for early Completion of Rehabilitation Plan
Hokuto Tsushin Kogyo	07/02	1	DBJ Fukoku Life	New non-main Existing main	Corporate reorganization (*kaisha-kousei*)	
Nagasakiya	11/02	1.2	DBJ Sumitomo Trust Mitsui Sumitomo	Existing main Existing main Existing main	Corporate reorganization (*kaisha-kousei*)	
Sakurano Department Store	12/02	1.5	DBJ Mitsui Sumitomo	New non-main Existing main	Corporate reorganization (*minji-saisei*)	
Izumi Industrial	02/03	6	DBJ Mizuho Bank	New non-main New non-main	Corporate reorganization (*minji-saisei*)	For early completion of procedures under the Civil Rehabilitation Law
Takarabune	03/03	1	Tokyo Star Bank	New non-main	Corporate reorganization (*minji-saisei*)	
Higashinihon Ferry	06/03	1	DBJ	Existing main	Corporate reorganization (*kaisha-kousei*)	
Nihon Colin	07/03	2	Tokyo Star Bank	New non-main	Corporate reorganization (*minji-saisei*)	
Tamon Shuzo	08/03	0.3	Tokyo Star Bank	New non-main	Corporate reorganization (*minji-saisei*)	
Narasaki	08/03	1	Hokuyo Bank Aozora Bank	Existing main New non-main	Corporate reorganization (*minji-saisei*)	
Matsuyadenki	09/03	3	Tokyo Star Bank	New non-main	Corporate reorganization (*minji-saisei*)	
Fujisan Shokai	10/03	5	DBJ UFJ Bank	New non-main New non-main	Corporate reorganization (*minji-saisei*)	

Company Name	Month /Year	Amount of Loan (Credit Limit billions of yen)	Lender	New Non-main/ Existing Main	Type of Legal Procedures	Comments
Morimoto Corporation	11/03	5	Mitsui Sumitomo	Existing main	Corporate reorganization (*minji-saisei*)	
Takiya Corp	12/03	1	Tokyo Star Bank	New non-main	Corporate reorganization (*minji-saisei*)	
TESAC/TWR	01/04	1.1	DBJ Mizuho Bank	New non-main	Corporate reorganization (*kaisha-kousei*)	To repay all secured claims in lump sum
MovieTelevision	03/04	0.5	Tokyo Star Bank	New non-main	Corporate reorganization (*minji-saisei*)	
Morihachi	03/04	0.7	Hokuriku Bank	Existing main	Composition	To conclude a composition
Nichibei ARTOM	04/04	0.6	DBJ Aozora Bank Shokochukin	Existing main Existing main Existing main	Corporate reorganization (*kaisha-kousei*)	To complete the reorganization plan early
Shizuoka Seihan	07/04	0.15	DBJ Shizuoka Bank	New non-main Existing main	Corporate reorganization (*minji-saisei*)	
Tohoku Enterprise	07/04	1	Tokyo Star Bank	New non-main	Corporate reorganization (*minji-saisei*)	
Ohki Corporation	07/04	6	Chuo Mitsui Trust	New non-main	Corporate reorganization (*minji-saisei*)	
Tokyo Blouse	09/04	0.3	Mitsui Sumitomo	Existing main	Corporate reorganization (*minji-saisei*)	

Note : DBJ: Development Bank of Japan
DKB: Dai-ichi Kangyo Bank
Source : Nihon Keizai Shinbun etc.

The Development Bank of Japan was involved in many cases as the lender at the start of DIP financing. We can interpret this to mean that there was a kind of cowbell effect in the field of DIP financing. In fact, there were quite a few cases in which reorganization was put on the right track under a new sponsor or a reorganization plan was completed early. We can say that the Development Bank of Japan was providing information production and risk bearing functions that private banks could not provide and was facilitating efficient debt restructuring as a result.

In the meantime, DIP financing in Japan is positioned as *Kyoeki Saiken* (common claims). Although claims on DIP financing are given repayment priority over general (unsecured) claims generated before the bankruptcy, they are subordinate to secured claims, tax claims, and labor claims. Therefore, it is difficult to differentiate or give preference to them over other common claims. In comparison to DIP financing in the U.S., claims on DIP financing in Japan are not necessarily given high repayment priority. It may be that the Development Bank of Japan had extended loans despite relatively high risks, thus causing overinvestment.

IV. Corporate Debt Restructuring and Government-Affiliated Financial Institutions

In this section, I will focus on firms that actually failed and examine empirically what kind of impact the existence of government-affiliated financial institutions has had on debt restructuring.

IV.1. Issues Concerning Corporate Debt Restructuring

Corporate debt restructuring can be largely categorized in one of two ways: as "legal procedures," in which reorganization or liquidation takes place in accordance with legal procedures, including corporate reorganization, civil rehabilitation, and corporate consolidation; or as "private procedures," in which reorganization or liquidation takes place outside of the legal procedures under certain guidelines or at the initiative of, say, the Industrial Revitalization Corporation of Japan.

Regardless of whether the procedures are legal or private, it is desirable from an economic standpoint to restructure a firm in such a way that its value is maximized. It is not necessarily clear, however, that actual debt restructuring is in line with the maximization of a firm's value.

For example, let's say a firm is restructured under legal procedures. Interests among senior and junior creditors may vary depending upon whether the firm continues after reorganization or is liquidated. In this case, even if a greater firm value would be created by the continuance or reorganization of the firm than by its liquidation, and if senior or secured creditors insist on liquidation and the liquidation is approved by a majority vote, the company would be liquidated, generating over-liquidation. On the other hand, even if a greater firm value would be created by liquidation than by continuing the business, and if the junior or unsecured creditors insist on reorganization and the reorganization is approved by a majority vote, a firm that should otherwise be liquidated may continue and be reorganized, generating under-liquidation.

A similar problem could happen in private procedures as well. Let's assume that a greater firm value is generated if debts are privately waived and reorganized than in a case where debts are restructured under the legal procedures. For example, this may be true when legal procedures decrease the trust in and reputation of the firm and cause valuable employees and business partners to leave. Even in this case, individual creditors have an incentive not to waive their own debts and instead to try to achieve a private reorganization at the expense of other creditors.

This is known as the free rider problem. If many creditors think in the same way, it would result in costly legal procedures. On the other hand, if creditors try to collect their claims at the same time through inefficient piecemeal liquidation, the firm may be forced into de facto bankruptcy (legal procedures). In either case, over-bankruptcy (excessive use of legal

procedures) happens in a sense that a company that should otherwise be privately reorganized becomes bankrupt [6].

By contrast, there is a possibility that a firm may avoid bankruptcy through private procedures, even when legal procedures are more desirable (i.e., under-bankruptcy). In fact, we cannot deny the possibility that junior creditors that do not want bankruptcy might agree to additional loans or debt waivers to mitigate the cash flow of the firm and delay legal procedures (*oigaashi*).

If corporate debt restructuring is not necessarily implemented in an efficient way as described above [7], the issues to be examined here are the extent of its inefficiency and its orientation: over/under-liquidation and over/under-bankruptcy. Therefore, in the following sections, an estimation model is used to evaluate these issues applying a qualitative response model.

IV.2. Debt Restructuring Efficiency Estimation Model

Let us assume that the corporate value of a firm (firm i) when legal reorganization, legal liquidation, or private reorganization takes place is expressed as V_i^C, V_i^L or V_i^B, respectively. Let us also assume that these values are determined by the following linear functions [8].

$$V_i^C = X_i\beta^C + u_i^C$$
$$V_i^L = X_i\beta^L + u_i^L$$
$$V_i^B = X_i\beta^B + u_i^B$$

Please note that X_i is a variable (vector) expressing the financial characteristics of the firm, $\beta^j\ (j=C,L,B)$ is a parameter common to firms, and $u_i^j\ (j=C,L,B)$ is a random disturbance.

Let's assume that the corporate value is composed of fixed assets that generate cash flow or operating income, plus current assets that do not generate cash flow. The cash flow is generated only when the firm continues its business, and it is difficult to sell or convert the fixed assets to other firms. From this assumption, we can infer that in the case of legal or private reorganization, the corporate value depends largely on operating income, while in the case of

---

[6] In this paper the term "bankruptcy" is used for companies that undergo legal bankruptcy procedures. In practice, when the treatment of assets is consigned completely to creditors without taking legal procedures, it is also treated as "bankruptcy" in many cases.

[7] Decision-making = selection (reorganization or liquidation) of corporate debt restructuring generally affects the interests of and distribution to individual claim holders simultaneously, and therefore a decision that is optimal to society is not always made. In other words, if there is a mechanism that coordinates interests among creditors in such a way that maximizes corporate value, an efficient debt restructuring becomes possible. In fact, it is known that when information regarding corporate value is shared among concerned parties, there is a mechanism that solves the problems of optimum debt restructuring and distribution at the same time. (Bebchuk (1988), Aghion, Hart, and Moore (1992), and Ikeo and Seshimo (1998)).

[8] If a corporate value is defined as the sum of current assets and fixed assets, which is the sum of cash flow in present value, the linear corporate value model described in this paper would be an acceptable theoretical process.

liquidation, it depends largely on current assets. The corporate value after debt restructuring is also considered to be influenced by an external disturbance term such as market demand.

In a qualitative response model, it is usually assumed that the one with the maximum utility (in this case, the corporate value) is selected among possible multiple choices. In this paper, however, it is assumed that an efficient debt restructuring procedure is not necessarily selected and that the actual procedure is based on the following criteria.

Restructuring through legal procedures: $V_i^C \gtrless \alpha V_i^L$ (1)

Restructuring through private procedures:

$$V_i^M \gtrless \beta V_i^B \text{ but } \begin{matrix} V_i^M = V_i^C & when\ V_i^C > \alpha V_i^L \\ = V_i^L & when\ V_i^C < \alpha V_i^L \end{matrix} \quad (2)$$

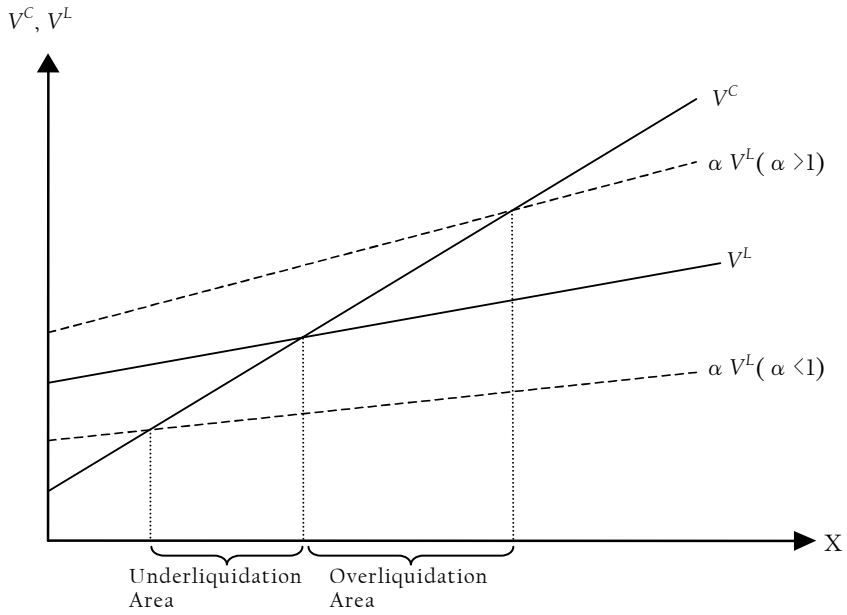
In other words, the interests among creditors concerning debt restructuring are not fully coordinated, and distortions represented by α and β (when both α and β are not 1) are created [9].

This means that, for example, in the case of legal procedures, not necessarily the greater of V_i^C or V_i^L is chosen. Rather, if α is greater than 1, even if V_i^C is greater than V_i^L, liquidation may be chosen (over-liquidation), whereas if α is smaller than 1, there is a risk of under-liquidation or over-reorganization. Likewise, in the case of private procedures, the greater corporate value, be it under the legal procedures (defined as V_i^M) or under the private procedures (V_i^B), is not necessarily chosen. Rather, if β is greater than 1, over-reorganization happens in a sense that a firm that should otherwise go bankrupt survives, and if β is smaller than 1, over-bankruptcy happens (See Figure 1).

The probability that a certain debt restructuring procedure is chosen can be formulated as a likelihood function by using actual corporate values for legal organization (V_i^C), legal liquidation (V_i^L), and private procedures/reorganization (V_i^B). In the following paragraphs, a likelihood function is formulated separately for three different scenarios: 1) when the choice of debt restructuring procedures is limited to legal procedures (i.e., legal organization or liquidation) ((VC, VL) Model), 2) when the choice is made among legal liquidation, legal reorganization, or private reorganization ((VC, VL, VB) model), and 3) when the choice is made among legal liquidation, legal reorganization, or private reorganization, but the choice among legal procedures (legal reorganization or liquidation) is nested ((VM, VB) model).

[9] We can also say that inefficiency is represented by a constant term, such as $V_i^C \gtrless \alpha + V_i^L$. However, in general, the bigger a company is, the more creditors it has. Therefore, it would be appropriate to say that inefficiency in the selection of a debt restructuring method is proportional to the corporate value.

Figure 1: Overliquidation and Underliquidation



IV.2.1. (VC, VL) Model

If the choice is limited to legal procedures (i.e., legal reorganization or legal liquidation), and it is made in accordance with formula (1), the probability that legal reorganization is selected and the corporate value becomes V_i^C is expressed as follows:

$$\begin{aligned}&\Pr(u_i^C = V_i^C - X_i\beta^C,\ u_i^L < (V_i^C - \alpha X_i\beta^L)/\alpha)\\&= \int_{-\infty}^{(V_i^C - \alpha X_i\beta^L)/\alpha} f(V_i^C - X_i\beta^C, u_i^L)du_i^L\end{aligned} \tag{3}$$

(where *f* is a joint density function for u_i^C and u_i^L)

The probability that legal liquidation is selected and the corporate value becomes V_i^L is expressed as follows:

$$\begin{aligned}&\Pr(u_i^C < \alpha V_i^L - X_i\beta^C,\ u_i^L = V_i^L - X_i\beta^L)\\&= \int_{-\infty}^{\alpha V_i^L - X_i\beta^C} f(u_i^C, V_i^L - X_i\beta^L)du_i^C\end{aligned} \tag{4}$$

When the probabilities of the former and the latter are expressed as $F_C(X_i)$ and $F_L(X_i)$, respectively, and the number of samples is expressed as N, the likelihood (L) that a certain debt restructuring procedure is selected can be expressed as follows:

$$L = \prod_{1}^{N} F_C(X_i)^{y_i} F_L(X_i)^{1-y_i} \tag{5}$$
$$y_i = 1 (if\ \ procedure\ is\ legal \quad reorganization), y_i = 0 (if\ \ procedure\ is\ legal \quad liquidation)$$

IV.2.2. (VC, VL, VB) Model

If the debt restructuring method is selected from the three options including private procedures in accordance with formulas (1) and (2), the probability that legal reorganization is selected and the corporate value becomes V_i^C is expressed as follows:

$$\begin{aligned} &\Pr(u_i^C = V_i^C - X_i\beta^C,\ u_i^L < (V_i^C - \alpha X_i\beta^L)/\alpha, u_i^B < (V_i^C - \beta X_i\beta^B)/\beta) \\ &= \int_{-\infty}^{(V_i^C - \alpha X_i\beta^L)/\alpha} \int_{-\infty}^{(V_i^C - \beta X_i\beta^B)/\beta} f(V_i^C - X_i\beta^C, u_i^L, u_i^B) du_i^B du_i^L \end{aligned} \tag{6}$$

Likewise, the probability that legal liquidation is selected and the corporate value becomes V_i^L is expressed as follows:

$$\begin{aligned} &\Pr(u_i^C < \alpha V_i^L - X_i\beta^C,\ u_i^L = V_i^L - X_i\beta^C, u_i^B < (\alpha V_i^L - X_i\beta^B)/\beta) \\ &= \int_{-\infty}^{\alpha V_i^L - X_i\beta^C} \int_{-\infty}^{(\alpha V_i^L - X_i\beta^B)/\beta} f(u_i^C, V_i^L - X_i\beta^C, u_i^B) du_i^B du_i^C \end{aligned} \tag{7}$$

In the meantime, the probability that a private procedure is selected and the corporate value becomes V_i^B is expressed as follows:

$$\begin{aligned} &\Pr(u_i^C < \beta V_i^B - X_i\beta^C,\ u_i^L < (\beta V_i^B - \alpha X_i\beta^L)/\alpha, u_i^B = V_i^B - X_i\beta^B) \\ &= \int_{-\infty}^{\beta V_i^B - X_i\beta^C} \int_{-\infty}^{(\beta V_i^B - \alpha X_i\beta^L)/\alpha} f(u_i^C, u_i^L, V_i^B - X_i\beta^B) du_i^L du_i^C \end{aligned} \tag{8}$$

In this case, the likelihood (L) that a certain procedure is selected can be expressed as follows [10]:

$$\begin{aligned} &L = \prod_{1}^{N} F_C(X_i)^{y_i} F_L(X_i)^{z_i} F_B(X_i)^{w_i} \\ &y_i = 1 (if\ \ procedure\ \ is\ legal\ \ reorganization), y_i = 0 (if\ \ otherwise) \\ &z_i = 1 (if\ \ procedure\ \ is\ legal\ \ liquidation), z_i = 0 (if\ \ otherwise) \\ &w_i = 1 (if\ \ procedure\ \ is\ private\ \ reorganization), w_i = 0 (if\ \ otherwise) \end{aligned} \tag{9}$$

[10] Although private procedures are chosen over legal procedures here, it is assumed that the realization of corporate value itself happens at the same time. If V^L and V^C are realized after V^B is realized, we need to modify the probability of certain debt restructuring choices to compare the expected corporate value after bankruptcy and V^B.

IV.2.3. (VM, VB) Model

The corporate value realized when legal procedures are taken, regardless of whether it is legal reorganization or liquidation, is expressed as follows:

$$V_i^M = X_i\beta^M + u_i^M \tag{12}$$

If the choice between legal procedures or private procedures is made through β, the probability that legal procedures are selected and the corporate value becomes V_i^M is expressed as follows:

$$\begin{aligned}&\Pr(u_i^M = V_i^M - X_i\beta^M,\ u_i^B < (V_i^M - \beta X_i\beta^B)/\beta)\\&= \int_{-\infty}^{(V_i^M - \beta X_i\beta^B)/\beta} f(V_i^M - X_i\beta^M, u_i^B)du_i^B\end{aligned} \tag{11}$$

The probability that the private procedures are selected and the corporate value becomes V_i^B is expressed as follows:

$$\begin{aligned}&\Pr(u_i^M < \beta V_i^B - X_i\beta^M,\ u_i^B = V_i^B - X_i\beta^B)\\&= \int_{-\infty}^{\beta V_i^B - X_i\beta^M} f(u_i^M, V_i^B - X_i\beta^B)du_i^M\end{aligned} \tag{12}$$

If the probability of the former is expressed as $F_M(X_i)$, and that of the latter is expressed as $F_B(X_i)$, the likelihood (L) that a certain procedure is selected can be expressed as follows:

$$\begin{aligned}&L = \prod_1^N F_M(X_i)^{z_i} F_B(X_i)^{1-z_i}\\&z_i = 1\,(if\ \ procedure\ is\ legal), y_i = 0\,(if\ \ procedure\ is\ \ private)\end{aligned} \tag{13}$$

IV.2.4. The Impact of Government-Affiliated Financial Institutions

We can estimate the efficiency of the choice of debt restructuring procedures in the above model by using the maximum-likelihood method.

Furthermore, it is possible to examine the impact of the existence of government-affiliated financial institutions by dividing sample cases into firms with borrowings from government-affiliated financial institutions and firms with no such borrowings. We can study whether there is any difference in the values of α and β between these groups of samples.

For example, let's assume that α is relatively larger (or smaller) in samples with borrowings from government-affiliated financial institutions than in samples with no such borrowings. In this case, the function of government-affiliated financial institutions can be

interpreted to raise (or lower) the probability of liquidation as the legal procedure and to harden (or soften) a firm's budget constraints. However, we have to note that the extent of efficiency itself should be evaluated by how close α is to 1.

Likewise, if β is relatively smaller (or larger) in samples with borrowings from government-affiliated financial institutions than in samples with no such borrowings, the function of government-affiliated financial institution can be interpreted to increase (or decrease) the probability of legal procedures over private procedures. Again we have to evaluate the efficiency by looking at the magnitude of discrepancy between β and 1.

IV.3. Overview of the Sample Data

Before discussing the estimation results concerning α and β, we will overview the sample data used in this section.

Table 4 shows list of failed firms used as primary samples. Total liabilities, listing section, category of business, and type of bankruptcy adopted are indicated. Also examined was whether or not there were borrowings from a government-affiliated institution. It seems that government-affiliated financial institutions tend to have made loans to larger firms belonging to the manufacturing and primary industries.

Table 5 summarizes the amounts of debt forgiveness with respect to firms whose debts were waived under private procedures, and whether or not there were borrowings from a government-affiliated institution. Details of private procedures are rarely disclosed, and in many cases only general information is reported.

Generally speaking, it will be desirable to use data as much as we can in order to estimate α and β efficiently. Therefore, in this paper we have calculated the magnitude of the corporate values [11] actually chosen in accordance with certain procedures. As for the concrete procedures for calculating corporate value, see the Appendix in this paper.

Table 6 shows the simple cross-section result on the relationship between the estimated corporate values and financial characteristics of the companies, including operating income, sales, cash and deposits, and the number of banks of account. In general, when a reorganization-type procedure is to be implemented, we can expect that corporate value would depend more on cash flow, which reflects operating income, sales, and other factors, since the business is continuing and the firm-specific activities will be important for the firm's value. On the other hand, in the case of a liquidation-type procedure, corporate value can be expected to depend more on liquid assets. In fact, the results of Table 6 show the expected sign.

[11] Typical estimations using a qualitative response model can identify only the differences between coefficients for corporate properties. In this paper, however, in addition to α and β, realized corporate values are also used as sample data, and therefore we can identify or estimate individual parameters.

Table 4: Examples of Bankrupt Companies (Since 1995, excluding financial institutions)

Month/ Year of Bankruptcy	Company Name	Listing Exchange	Total Liabilities (100 Millions of Yen)	Type of Business	Type of Bankruptcy	Loans from a Government –affiliated Financial Instruction
01/95	Nihon Data Equipment	OTC	415	sales of office appliances	bankruptcy	
02/95	Hokkaido Colliery & Steamship	OTC	882	sales of coal	corporate reorganization *(kaisha –kousei)*	yes
02/95	Sorachi Coal Mining	Unlisted	378	coal mining	corporate reorganization *(kaisha –kousei)*	yes
05/95	Oriental Shashin Kogyo	TSE 2	210	manufacturing of contact paper	corporate reorganization *(kaisha –kousei)*	
08/95	Senko Sangyo	OTC	1260	sales of houses	corporate consolidation	
11/95	Phoenix Electric	OTC	195	manufacturing of lamps	corporate reorganization *(kaisha –kousei)*	
04/96	Sanho Shokai	Unlisted	620	wholesale of non–ferrous metals	liquidation	
09/96	Olympic Sports	OTC	355	sales of sporting goods	liquidation	
01/97	Kyotaru	TSE 1	1013	sushi	corporate reorganization *(kaisha –kousei)*	yes
01/97	Coco Yamaoka	Unlisted	481	sales of precious metals	liquidation	
02/97	IGS	OTC	56	software development	liquidation	
02/97	Suzuya	Unlisted	587	women's clothes	composition	
03/97	Isuzu Kensetsu	OSE 2	623	construction	special liquidation	
05/97	Kyoundo Pharmaceutical	Unlisted	445	wholesale drugs and medicine	liquidation	
07/97	Tokai Kogyo	TSE 1	5110	construction	corporate reorganization *(kaisha –kousei)*	
07/97	Tada Corporation	TSE 1	1714	construction	corporate reorganization *(kaisha –kousei)*	yes
08/97	Daito Kogyo	TSE 1	1592	construction	corporate reorganization *(kaisha –kousei)*	
09/97	Yaohan Japan	TSE 1	1613	supermarket	corporate reorganization *(kaisha –kousei)*	
10/97	Namirei	Unlisted	500	general piping	corporate reorganization *(kaisha –kousei)*	
11/97	Sanyo System	Unlisted	755	vendor development of software	liquidation	
12/97	Toshoku	TSE 1	6397	food trading	corporate reorganization *(kaisha –kousei)*	
12/97	Nitto Life	OTC	692	golf clubs	composition	
12/97	Hakodate Seiko Sengu	Sapporo	138	manufacturing of fish nets	liquidation	yes

Month/ Year of Bankruptcy	Company Name	Listing Exchange	Total Liabilities (100 Millions of Yen)	Type of Business	Type of Bankruptcy	Loans from a Government -affiliated Financial Instruction
01/98	Toyoko Construction	Unlisted	357	civil engineering and construction	liquidation	
02/98	Daido Concrete	TSE 1	192	manufacturing of concrete	corporate reorganization *(kaisha -kousei)*	
03/98	Nihon Tochi Kairyo	Unlisted	563	land leases	corporate reorganization *(kaisha -kousei)*	
04/98	Asahi Corporation	Unlisted	1300	rubber footwear	corporate reorganization *(kaisha -kousei)*	
06/98	Mitsui Warf	TSE 2	203	transportation/ warehouse	corporate reorganization *(kaisha -kousei)*	yes
07/98	Asakawagumi	OSE 1	603	construction	corporate reorganization *(kaisha -kousei)*	
08/98	Okura Shoji	TSE 1	2528	all-purpose trading company	liquidation	
09/98	Longchamp	OSE 2	87	women's apparel	corporate reorganization *(kaisha -kousei)*	
09/98	Yahagi	TSE 1	35	imaging and software	liquidation	
09/98	Urban Home	Unlisted	350	sales of buildings	liquidation	
09/98	Nihon Lease Auto	Unlisted	1259	automobile leases	corporate reorganization *(kaisha -kousei)*	
10/98	Morisho	OTC	161	condominiums and built-for sale houses	liquidation	
10/98	Tescon	OTC	117	testers	liquidation	
11/98	Yoshihara Gumi	Unlisted	450	general civil engineering work	corporate reorganization *(kaisha -kousei)*	
12/98	Toa Kogyo	Unlisted	370	civil engineering work	liquidation	
12/98	JDC (Kokudo)	TSE 1	4067	construction	corporate reorganization *(kaisha -kousei)*	
03/99	Komuson	OSE 2	115	pachinko parlors	liquidation	
03/99	Asahi Toshi Kaihatsu	Unlisted	3226	sales and purchase of buildings	liquidation	
03/99	Nakayama Kogyo	Unlisted	401	electrical steel	corporate reorganization *(kaisha -kousei)*	yes
04/99	Sasaki Glass	TSE 1	402	manufacturing of dishware	corporate reorganization *(kaisha -kousei)*	
04/99	Nikko Electric Industry	TSE 2	141	electric automobile components	corporate reorganization *(kaisha -kousei)*	yes
05/99	Aikoh	OTC	77	manufacturing of chemical products	liquidation	

Month/ Year of Bankruptcy	Company Name	Listing Exchange	Total Liabilities (100 Millions of Yen)	Type of Business	Type of Bankruptcy	Loans from a Government -affiliated Financial Instruction
07/99	Kokoku Steel Wire	TSE 2	333	manufacturing of ropes	corporate reorganization *(kaisha -kousei)*	yes
08/99	Murakado Construcution	Unlisted	350	general civil engineering	corporate reorganization *(kaisha -kousei)*	
10/99	Picoi	OTC	98	housing improvement	composition	
02/00	Nagasakiya	TSE 1	3039	supermarket	corporate reorganization *(kaisha -kousei)*	
02/00	L Kakuei	TSE 1	1351	real estate	corporate reorganization *(kaisha -kousei)*	
04/00	Talahashi Building	Unlisted	1334	office leases	corporate reorganization *(minji -saisei)*	
04/00	Toyo Rope Mfg.	TSE 2	59	manufacturing of wire ropes	corporate reorganization *(minji -saisei)*	
05/00	Dai-Ichi Hotel	TSE 1	1152	hotel	corporate reorganization *(kaisha -kousei)*	
06/00	ITO	Unlisted	386	office equipment	corporate reorganization *(minji -saisei)*	
06/00	Nihon Building Project	Unlisted	5600	office leases	corporate reorganization *(minji -saisei)*	
07/00	Osada	Unlisted	348	sales of various products	corporate reorganization *(minji -saisei)*	
07/00	Sogo	TSE 1	6891	department stores	corporate reorganization *(minji -saisei)*	yes
07/00	Nagasakiya	OSE 2	125	western-style confections manufacturer	liquidation	
09/00	Kawasaki Electric	TSE 2	253	manufacturing of distribution boards	corporate reorganization *(minji -saisei)*	
09/00	Fujii	TSE 1	108	wholesale of knitting materials	corporate reorganization *(minji -saisei)*	
10/00	Rocket	Unlisted	413	sales of home appliances	corporate reorganization *(minji -saisei)*	
11/00	Akai Electric	TSE 1	470	audio equipment	corporate reorganization *(minji -saisei)*	
12/00	Marutomi	NSE 2	761	retail of shoes	corporate reorganization *(minji -saisei)*	yes
01/01	Fujiseiko	Unlisted	370	machinery and appliances	liquidation	
02/01	Ikegai	TSE 1	271	machine tools	corporate reorganization *(minji -saisei)*	
02/01	Fuji Car MFG	TSE 1	210	bridges	corporate reorganization *(minji -saisei)*	

Month/ Year of Bankruptcy	Company Name	Listing Exchange	Total Liabilities (100 Millions of Yen)	Type of Business	Type of Bankruptcy	Loans from a Government –affiliated Financial Instruction
03/01	Fujiko	TSE 1	831	construction	corporate reorganization (*minji –saisei*)	
03/01	Footwork International	OSE 2	237	sales of local products	corporate reorganization (*minji –saisei*)	
03/01	Better Life	OSE 2	231	housing	corporate reorganization (*minji –saisei*)	
09/01	Mycal	TSE 1	13881	supermarkets	corporate reorganization (*kaisha –kousei*)	
09/01	Haruyama Chain	OTC	128	retails of men's wear	corporate reorganization (*minji –saisei*)	
10/01	Ohkura Electric	TSE 1	86	industrial equipment	corporate reorganization (*minji –saisei*)	
11/01	Niigata Engineering	TSE 2	2270	integrated plant	corporate reorganization (*kaisha –kousei*)	
11/01	Ergotech	TSE 2	440	air conditioning work	corporate reorganization (*minji –saisei*)	
11/01	Nanaboshi	OSE 2	62	electrical power work	corporate reorganization (*minji –saisei*)	
12/01	Aoki Construction	TSE 1	3900	construction	corporate reorganization (*minji –saisei*)	yes
12/01	Kotobukiya	OSE 1	2126	supermarkets	corporate reorganization (*minji –saisei*)	yes
02/02	Sato Kogyo	TSE 1	4499	construction	corporate reorganization (*kaisha –kousei*)	
07/02	Dai Nihon Constrution	TSE 1	2712	construction	corporate reorganization (*minji –saisei*)	
09/03	Matsuyadenki	OSE 1	661	sales of home appliances	corporate reorganization (*minji –saisei*)	
10/03	Morimotogumi	OSE 1	2153	construction	corporate reorganization (*minji –saisei*)	

Note : Corporation with loans from government–affiliated financial institutions (Development Bank of Japan, Japan Bank for International Cooperation, and the Shoko Chukin Bank)
TSE 1: 1st Section of the Tokyo Stock Exchange
TSE 2: 2nd Section of the Tokyo Stock Exchange
OSE 1: 1st Section of the Osaka Stock Exchange
OSE 2: 2nd Section of the Osaka Stock Exchange
NSE: Nagoya Stock Exchange

Source : Teikoku Databank, *Kigyo Keiretsu Soran* (Toyo Keizai Inc.), etc.

Table 5: Cases of Debt Waiver of Listed Companies (Private Procedures)

Month/Year	Company Name	Amount of Debt Waived (100 million yen)	Existence of Loans from a Government-Affiliated Financial Institution
01/99	Urban Life	230	
02/99	Towa Fudosan	2900	
02/99	Shokusan Jutaku Sogo	656	
02/99	Pasco	360	
03/99	Aoki Construction	2049	yes
04/99	Sato Kyogyo	1109	
04/99	Chuo Paperboard	114	
05/99	HASEKO Corporation	3546	
05/99	Kanematsu	1550	
02/00	TOMEN	2000	yes
03/00	Inoue Kyogyo	143	
06/00	Hazama	1050	
12/00	Kumagai Gumi	4300	
12/00	Mitsui Construction	1420	
11/01	Ichida	83	
02/02	Daiei	1700	yes
02/02	Iwataya	280	yes
03/02	Misawa Homes	350	yes
03/02	Toyo Shutter	125	yes
05/02	Daikyo	4100	
01/03	Hazama Corporation	1390	
03/04	Naito	188	
07/04	Kanebo	995	

Note : Corporation with loans from government-affiliated financial institutions (Development Bank of Japan, Japan Bank for International Cooperation, and the Shoko Chukin Bank)
Source : Teikoku Databank

Table 6: Estimated Corporate Value and Financial Indicators (OLS Estimation)

( ) white t value(**1% *5% significance)

	V^L		V^C		V^B	
Const.	23.07 (1.73)	25.21 (1.75)	78.9 (0.54)	112.6 (0.88)	196.6 (0.12)	487.3 (0.70)
Operating Income	0.57 (0.09)		−6.41 (−0.67)		17.53* (1.99)	
Sales		−0.01 (−0.55)		−0.01 (−0.03)		0.23** (8.99)
Cash and Deposits	2.77** (3.91)	2.74** (3.35)	4.51 (1.38)	3.54 (0.96)	1.17 (0.36)	1.76 (1.07)
Number of Accounts of Banks	−7.72 (−1.21)	−6.51 (−0.91)	2.74 (0.55)	20.7 (0.49)	200.9 (0.56)	16.01 (0.12)
Adj R2	0.81	0.84	0.11	0.11	0.54	0.90
JB	3.8	4.6	12.5	12.8	0.78	0.69

Note : Numbers for operating income and sales are taken from the most recent financial reports
JB:Jargque-Bera Residual Normality Test Statistic
Numbers for number of accounts of banks are the numbers listed under "*torihiki ginko su* (number of accounts of banks)" in *Kaisha Shikiho*

IV.4. Results of Estimation and Interpretation

Table 7 summarizes the results of α and β. In the table, ρ represents the correlation coefficients of the disturbance terms between legal liquidation and legal reorganization, which are given exogenously to reduce the number of parameters estimated [12] (ρ = 0, 0.5, −0.5).

First, in almost all samples, the estimated results were $\alpha < 1$, $\beta < 1$, and the null hypothesis of $\alpha = 1$, $\beta = 1$ was rejected [13][14]. This means that there are overall tendencies for under-liquidation and over-bankruptcy in debt restructuring in Japan[15].

Next, let's look at α and β where there are borrowings from government-affiliated financial institutions and where there are not. Although there is a tendency for the value of α to be smaller (closer to 0) in the sub-sample where there are borrowings from government-affiliated financial institutions in comparison to the case where there are not, almost no difference is observed between these types of cases. In the meantime, we can say that the value of β is larger when there are borrowings from government-affiliated financial institutions.

This can be interpreted to mean that, when the choice is limited to legal procedures, the existence of government-affiliated financial institutions does not impact the choice of debt restructuring procedures between legal reorganization and liquidation. At the same time, the existence of such institutions functions to facilitate private procedures or to block legal procedures, when the choice is between private or legal procedures. As for the value of β, although the null hypothesis of $\beta = 1$ is not rejected in many cases, in some models $\beta > 1$ is observed. This seems to suggest that when there are borrowings from government-affiliated financial institutions, the choice between private or legal procedures sometimes becomes efficient. On the other hand, sometimes private procedures are taken even for firms that should otherwise take legal procedures.

---

[12] There are two debt restructuring method choices, forming a nested structure: first, there is a choice between legal or private procedures, and then, when legal procedures are selected, there is a choice between liquidation or reorganization. Therefore, there is a possibility that a positive correlation is generated between legal liquidation and reorganization. We can consider that a common shock (the cost of bankruptcy) is generated. If there is a shock that increases the corporate value under legal reorganization (i.e., the improvement of reorganization laws), as well as a shock that decreases corporate value under the liquidation (i.e., a sluggish real estate market), the correlation may become negative.

[13] When $\rho < 0$, the estimate of α tends to become large. The reason why legal reorganizations are selected in many cases is not because debt restructuring is inefficient (low α), but because corporate value is thought to increase under reorganization rather than under liquidation.

[14] As for the causal relationship between α and β, we can usually think of the impact of legal procedures (α) on private procedures (β). However, the relationship here may be the impact of the possibility of over-bankruptcy ($\beta < 1$) on over-reorganization under legal procedures ($\alpha < 1$).

[15] We need to note that even when α and β are significantly different from 1, it does not necessarily mean all companies take an inefficient debt restructuring method.

Table 7: Estimation of α and β

Amounts in parentheses are t values against null hypothesis = 1

	α						β					
	(VC, VL) Model			(VC, VL,VB) Model			(VM, VB) model			(VC, VL,VB) Model		
	ρ=0	ρ=0.5	ρ=−0.5	ρ=0	ρ=0.5	ρ=−0.5	ρ=0	ρ=0.5	ρ=−0.5	ρ=0	ρ=0.5	ρ=−0.5
All Samples	0.03** (−2.72)	0.03** (−3.91)	0.04* (−1.72)	0.04** (−18.0)	0.04** (−19.3)	1.56 (1.66)	0.01** (−66.2)	1.23 (0.28)	0.02** (−11.4)	0.05** (−9.7)	0.05** (−9.5)	0.02** (−63.8)
With Loans from Government − Affiliated Financial Institutions	0.03** (−2.82)	0.02** (−3.23)	0.02 (−1.35)	0.02** (−21.0)	0.02** (−24.3)	1.43 (1.64)	1.02 (0.18)	1.01 (0.14)	0.01** (−18.2)	2.09 (0.81)	3.43* (1.68)	2.19 (0.48)
No Loans from Government − Affiliated Financial Institutions	0.03** (−2.71)	0.03** (−2.85)	0.04 (−1.20)	0.06* (−2.1)	0.05** (−18.1)	1.67 (1.18)	0.01** (−17.2)	1.41 (0.32)	0.01** (−14.2)	0.03** (−10.6)	0.03* (−11.8)	0.01** (−63.2)

(Note) Normal distribution model maximum likelihood method BHHH)。
For initial values, OLS estimation was used (except that initial values for α and β are 1)
For ρ in (VC, VL, VB) models, only the correlation between VC and VL are shown (assumption: VB is independent)
Number of samples: Total samples: 77
Samples of companies with loans from government−affiliated financial institutions: 19
Samples of companies with no loans from government−affiliated financial institutions: 58

Why do firms tend to select private procedures when there are borrowings from government-affiliated financial institutions? Government-affiliated financial institutions were not allowed to waive their debts until 2003, and cases of debt waiver by such institutions are not included in the samples for analysis. The fact that government-affiliated financial institutions did not agree to debt waivers seems to have simply made private procedures more difficult, but in fact the opposite result was observed. There may have been a mechanism in which the unwillingness of such institutions to agree to debt waivers raised incentives for private financial institutions to seek private procedures. There is also a view that their unwillingness to agree to debt waivers made it difficult to implement radical debt restructuring for firms with excessive borrowings. Under such circumstances, private financial institutions may have waived debts to mitigate immediate financial problems. Further studies are needed on the impact of government-affiliated financial institutions by including sample cases in which debt waivers were allowed or the Industrial Revitalization Corporation of Japan was involved.

V. Conclusions

In this paper, I have examined effects of government-affiliated financial institutions on corporate debt restructuring. There are two views regarding this subject: the so-called soft budget view and the hard budget view. The former holds that public financial institutions in general have difficulty committing to refrain from additionally funding distressed firms and instead have a strong tendency to allow the continuation of business (i.e., reorganization) for even inefficient firms. The latter view holds that public financial institutions should prefer corporate liquidation rather than the continuation of business because they are more secured by mortgages and more reluctant to forgive debts than private financial institutions.

So far, I have examined empirically the role and impact of public financial institutions, government-affiliated financial institutions in particular, from the viewpoints of 1) DIP financing and 2) selection of bankruptcy procedures for distressed firms.

The conclusions of this paper are as follows.

In the field of DIP financing, the Development Bank of Japan always takes the lead and is followed by private financial institutions. That is, there exists so-called "cowbell effect" which would be inconsistent with the hard-budget view. However, it is unclear whether or not the Development Bank of Japan is more capable of producing information than private financial institutions, because only a few years have passed since the initiation of DIP financing.

Next, as for the selection efficiency of a debt restructuring procedure, no large difference was observed between firms with borrowings from government-affiliated financial institutions and those without, when the choice was limited to legal procedures (Houteki Seiri). The same extent of over-liquidation was observed in both cases. Meanwhile, when the choice includes private procedures, the tendency was toward private procedures when companies had

borrowings from government-affiliated financial institutions. As for the selection efficiency, it was observed that in some cases private procedures were excessively chosen even when legal procedures were more desirable. In this sense, the existence of government-affiliated financial institutions may have had the effect of delaying a drastic debt restructuring. This possibility would be consistent with the soft-budget view.

Appendix

In the model in Section 4, unlike the typical qualitative response model, the data also includes the magnitude of corporate value achieved when a certain debt restructuring procedure is taken. To put it more precisely, corporate values were calculated by using the total amount of dividends in the case of legal liquidation, and the amount of repayment under a reorganization plan in the case of legal reorganization or debt waiver. In the case of private reorganization or debt waiver, corporate value was estimated by applying the option pricing model. The precise calculation procedures are as follows.

1) Estimation of Corporate Value in Legal Liquidation:

In the case of legal procedures, when bankruptcy or special liquidation was selected, the total amount of repayment (dividends) to the creditors was used as corporate value.

2) Estimation of Corporate Value in Legal Reorganization:

In the case of legal procedures, when corporate reorganization (*kaisha-kousei*), composition with creditors, corporate consolidation or civil reorganization (*minji-saisei*) procedures were taken and a reorganization plan was approved, the total scheduled repayment amount of preferential (secured) and general (unsecured) claims was used for the corporate value.

3) Estimation of Corporate Value in Private Reorganization:

In the case of debt waiver or private reorganization, the total liabilities after the debt waiver were regarded as the striking price and the total stock value (market value) of a firm was regarded as the call option value, then the corporate value was calculated backward by using the Black and Scholes European type option price formula.

In 1) and 2), the discount rate for future repayment was assumed to be 0. I simply totaled the amounts of repayment in the repayment period of the plan. In 3), I attempted to estimate corporate values based on stock market evaluation by using the option theory. Debt waiver by financial institutions before bankruptcy has been criticized for not being sufficient in amount and for being determined in accordance with the strength of financial institutions. However, because the market values of liabilities were also calculated by using the option theory, the approach taken in this paper is less problematic than defining corporate value as the sum of the face value of liabilities after debt waiver and stock market values. In these estimations, I have assumed the interest rate for safe assets to be 0, and maturing in one year, and used the Nikkei

Average Implied Volatility as the underlying asset volatility[16].

Supplemental Table 1 summarizes the averages of corporate values (V^L, V^C and V^B) estimated in the above method and their standard deviation. According to this table, the average and the standard deviation of the corporate values are low in liquidation-type debt restructuring, while both values are high in reorganization-type restructuring. This can be interpreted to mean that the larger a company is, the more reorganization-type debt restructuring takes place.

Supplemental Table 2 compares corporate values under private procedures in the case where the value is calculated by using the option theory, as explained above, and in the case where the value is simply calculated by deeming the face value of liabilities after debt waiver as the value of the claims, and adding that value to the total stock market value. This table shows that sometimes there is almost no difference between the two, but sometimes the difference between the two is relatively large. The corporate value is smaller in the option approach.

Supplemental Table 1 : Descriptive Statistics concerning Estimated Corporate Value

100 million yen

	V^L	V^C	V^B
Average	87	390	2574
Standard Deviation	203	831	2709

V^L: Corporate value realized under liquidation (bankruptcy or special liquidation cases, 26 companies)
V^C: Corporate value realized under reorganization (corporate reorganization *(kaisha-kousei)*, civil reorganization (*minji-saisei*) or composition-with-creditors cases, 39 companies)
V^B: Corporate value realized under reorganization (private procedures/debt waiver cases, 12 companies)

Supplemental Table 2: Comparison of the Face Value of Liabilities and the Market Value of Liabilities

100 million yen

Company (anonymous)	Face Value of Liabilities	Market Value of Liabilities (Option Approach)
A	2519	2507
B	522	521
C	1281	1280
D	1530	1433
E	236	235
F	4791	4776
G	9332	8343
H	173	171
I	2880	2863
J	5035	4460
K	2425	2323
L	173	156

[16] If the volatility of true corporate value is larger than the Nikkei Implied Volatility, option prices become larger than corporate values, and, therefore, corporate value estimated in this payer may be over-evaluated.

References

Aghion, P., O., Hart and J. Moore, "The Economics of Bankruptcy Reform," *Journal of Law, Economics and Organization*, 8, 1992, 523–546.

Andrade, G., and S. N. Kaplan, "How Costly is Financial (not Economic) Distress? Evidence from Highly Leveraged Transactions that Became Distressed", *Journal of Finance*, 53, 1998, 1443–1493.

Asquith, P., R. Gertner, and D. Sharfstein, "Anatomy of Financial Distress: An Examination of Junk Bond Issuers," *Quarterly Journal of Economics*, 109, 1994, 625–654.

Bebchuk, L. A., "A New Approach to Corporate Reorganizations," *Harvard Law Review*, 101, 1988, 775–804.

Dahiya, S., K. John, M. Puri, and G. Ramirez, "Debtor in Possession Financing and Bankruptcy Resolution: Empirical Evidence," *Journal of Financial Economics*, 69, 2003, 259–280.

Dewatripont, M., and E., Maskin, "Credit and Efficiency in Centralized and Decentralized Economics," *Review of Economic Studies*, 62, 1995, 541–555.

Garbade, K., *Pricing Corporate Securities as Contingent Claims*, MIT, 2000.

Gertner,, R. and D. Schfarfstein, "A Theory of Workouts and the Effects of Reorganization Law," *Journal of Finance*, 46, 1991, 1189–1222.

Gilson, S., "Bankruptcy, Boards, Banks and Stockholders," *Journal of Financial Economics*, 27, 1990, 355–388.

Gilson, S., John, K., L. Lang, "Troubled Debt Restructuring: An Empirical Study of Private Reorganizations of Firms in Default", *Journal of Financial Economics*, 27, 1990, 315–354.

Hart, O., "Different Approaches to Bankruptcy," Discussion Paper, Harvard University, 2000.

Haung, H., and C., Xu, "Institutions, Innovations, and Growth", *American Economic Review*, 89, 1999, 438–443.

Hotchkiss, E., "Post Bankruptcy Performance and Management Turnover," *Journal of Finance*, 50, 1995, 3–22.

Kornai, J., *Economics of Shortage*, North–Holland, 1980. (Edited and Translated by Tsuneo Morita. "*Han Kinko to Fusoku no Keizai Gaku*," Nippon–Hyoron Sha Co., Ltd., 1983).

Laporta, R., Lopez de Silanes, A. Shleifer, and R. Vishney, "Law and Finance," *Journal of Political Economy*, 106, 1998, 1113–1155.

Li, D., "Insider Control and the Soft Budget Constraint: A Simple Theory," *Economics Letters*, 61, 1998, 307–311.

Maskin, E., "Theories of the Soft Budget–Constraint," *Japan and the World Economy*, 8, 1996, 125–133.

Maskin, E., "Recent Theoretical Work on the Soft Budget Constraint," *American Economic Review*, 89, 1999, 421–425.

Qian, Y., and C., Xu, "Innovation and Bureaucracy Under Soft Budget and Hard Budget

Constraints", *Review of Economics Studies*, 65, 1998, 151–164.

Segal, I., "Monopoly and Soft Budget Constraint", *RAND Journal of Economics*, 29, 1998, 596–609.

Shleifer, A. and R. Vishney, "Politicians and Firms," *Quarterly Journal of Economics*, 23, 1994, 995–1025.

Kazuto Ikeo and Hirohumi Seshimo, "Nihon ni okeru Kigyo Hatan Seido no Seido Teki Wakugumi" (Institutional Framework for Corporate Debt Restructuring System in Japan) in *Kaisha Ho no Keizaigaku* (Economics of Corporate Law) edited by Yoshiro Mitsuwa, Hideki Kanda and Noriyuki Yanagikawa, Tokyou Daigaku Shuppankai (University of Tokyo Press), 1998.

Hidehumi Ito and Hiroshi Osano, "Insentibu Sekkei no Keizaigaku" (Economics of Incentive Design) Keisou Shobou, 2003.

Shinjiro Takagi, "Beikoku Tohsanho no Jitsumu" (Practice of U.S. Bankruptcy Law), Shoji Homu Kenkyukai (Commercial Law Center, Inc.), 1996.

Shinjiro Takagi, Ushio Yamazaki and Makoto Ito, ed. "Minji Saiseiho no Jitsumu" (Practice of Civil Rehabilitation Law), Kinyu Zaisei Jijo Kenkyukai (Kinzai Institute for Financial Affairs Inc.), 2001.

Shinjiro Takagi, "Kigyo Saisei no Kiso Chishiki" (Basic Knowledge on Corporate Rehabilitation), Iwanami Shoten, 2003.

Zenkoku Ginko Kyokai (Japanese Bankers Association), "Shiteki Seiri ni Kansuru Gaidorain" (Guideline concerning Private Procedures), Shiteki Seiri ni kansuru Gaidorain Kenkyukai, 2001.

Zenkoku Ginko Kyokai (Japanese Bankers Association), "Seihukei Kinyukikan no Bapponteki Kaikaku nimuketa Teigen" (Proposal toward Drastic Reforms of Government-affiliated Financial Institutions), 2001.

Tatsuya Terasawa, Keiichiro Kobayashi, Futaba Hirano and Hironori Ishizaka, ed. "Keisu Sutadei Kaisha Kosei Kigyo Sonogo" (Case Studies on Companies after Applying Corporate Rehabilitation Law), Kinyu Zaisei Jijo Kenkyukai (Kinzai Institute for Financial Affairs Inc.), 2002.

Mikinari Higano, "Kinyu Kikan no Shinsa Nohryoku" (Appraisal Capabilities of Financial Institutions), Tokyo Daigaku Shuppan Kai (University of Tokyo Press), 1986.

Kenya Fujiwara, "Kigyo no Hatanshori wo meguru Kenkyu no Tenbo" (Outlook of Studies on Corporate Debt Restructuring), Kinyu Sisutemu Kenkyukai Disukasshon Pepaa Shiriizu 15 (Financial System Study Committee Discussion Paper Series 15), 2004.

Akiyoshi Horiuchi, "Nihon no Kinyu Sisutemu – Mein Banku Kinoh no Saiko." (Japanese Financial System – Reviewing Main Bank Functions) in *Saihou Nihongata Keizai Sisutemu*, (Revisiting Japanese Style Economic System) Edited by Keimei Kaizuka and Zaisei Sogo Seisaku Kenkyujo, Yuhikaku, 2002.

Akiyoshi Horiuchi and Zui Seien, "Johoh Seisansha toshiteno Kaihatsu Ginko – Sono Kinoh to

Genkai" (Development Bank of Japan as Information Producer – its functions and limit" in *Henkakuki no Kinyu Sisutemu* (Financial System in Transition Period) edited by Kaizuka and Ueda, Tokyo Daigaku Shuppan Kai. (University of Tokyo Press), 1994.

Akiyoshi Horiuchi and Zui Seien, "Meinbanku Kankei no Keizai Bunseki: Tenbo" (Economic Analysis of Main Bank Relationship: Outlook), in *Kinyu Keizai Kenkyu* (Financial Economic Studies) 3, 1992. 8–25.